## Listing of Claims

What is claimed is:

1. (Currently Amended) A method of producing hydrogen comprising:

reacting a first portion of particles of a hydride with water to produce heat in a first reaction and reacting, in the solid-state, a mixture of a second portion of particles of said hydride and particles of a hydroxide in a second reaction, by transferring said heat thereto, the hydride comprising lithium-containing cations and the hydroxide comprising lithium-containing cations.

2. (Original) The method according to claim 1 wherein said second reaction produces hydrogen.

3. (Original) The method according to claim 1 wherein said first reaction produces at least a portion of said hydroxide.

4. (Original) The method according to claim 1 wherein said second reaction commences while said first reaction is occurring.

5. (Original) The method according to claim 1 wherein said second reaction is exothermic.

6. (Original) The method according to claim 1 wherein said second reaction producing hydrogen is endothermic.

7. (Original) The method according to claim 1 wherein said water is added to said hydride.

8. (Original) The method according to claim 7 wherein said amount of heat generated is greater than or equal to an activation energy of said second reaction.

9. (Original) The method according to claim 8 wherein said second reaction proceeds to substantial completion and said second portion of hydride is substantially consumed in said second reaction.

10. (Currently Amended) The method according to claim 1 wherein said hydride is represented by the formula: $MI^{x}H_{x}$, where MI represents Li or Li and an additional element or radical ~~one or more cationic species other than hydrogen~~ and x represents an average valence state of MI.

11. (Currently Amended) The method according to claim 1 wherein said hydroxide is represented by the formula: $MII^{y}(OH)_{y}$, where MII represents Li or Li and an additional element or radical ~~one or more cationic species other than hydrogen~~ and y represents an average valence state of MII.

12. (Currently Amended) The method of claim 1 wherein said hydride is represented by $MI^{x}H_{x}$ and said hydroxide is represented by $MII^{y}(OH)_{y}$, where MI and MII respectively represent Li or Li and an additional element or radical ~~one or more cationic species other than hydrogen~~, and x and y represent average valence states of MI and MII, respectively.

13. (Canceled)

14. (Currently Amended) The method of claim 12 ~~claim 1~~ wherein MI and MII comprise one or more of the same cationic species.

15. (Currently Amended) The method of claim 12 ~~claim 1~~ wherein MI or MII is a complex cationic species comprising two distinct cationic species.

16. (Currently Amended) The method of claim 10 ~~claim 1~~ wherein MI represents Li and an additional element or radical ~~is~~ selected from the group consisting of $CH_3$, Al, As, B, Ba, Be, Ca, Cd, Ce, Cs, Cu, Eu, Fe, Ga, Gd, Ge, Hf, Hg, In, K, La, ~~Li~~, Mg, Mn, Na, Nd, Ni, Pb, Pr, Rb, Sb, Sc, Se, Si, Sm, Sn, Sr, Th, Ti, Tl, V, W, Y, Yb, Zn, Zr, and mixtures thereof.

17. (Currently Amended) The method of claim 11 ~~claim 1~~ wherein MII represents Li and an additional element or radical ~~is~~ selected from the group consisting of $CH_3$, $C_2H_5$, $C_3H_7$, Al, As, B, Ba, Be, Ca, Cd, Ce, Cs, Cu, Eu, Fe, Ga, Gd, Ge, Hf, Hg, In, K, La, ~~Li,~~ Mg, Mn, Na, Nd, Ni, Pb, Pr, Rb, Sb, Sc, Se, Si, Sm, Sn, Sr, Th, Ti, Tl, V, W, Y, Yb, Zn, Zr, and mixtures thereof.

18. (Currently Amended) The method of claim 12 wherein MI and MII are each ~~elements~~ independently Li or Li and an additional element or radical selected from the group consisting of Al, B, Be, Ca, K, ~~Li,~~ Mg, Na, Sr, Ti, and mixtures thereof.

19. (Currently Amended) The method of claim 12 wherein said hydroxide further comprises: $MII^y(OH)_y \cdot wH_2O$, where ~~MII represents said one or more cationic species other than hydrogen, y represents an average valence state of MII, and~~ w represents a stoichiometric amount of hydrated water.

20. (Currently Amended) The method according to claim 1 wherein said hydroxide is represented by the formula: $MII^y(OH)_y \cdot wH_2O$, where MII represents Li or Li and an additional element or radical ~~said one or more cationic species other than hydrogen~~, y represents an average valence state of MII, and w represents a stoichiometric amount of hydrated water.

21. (Currently Amended) The method of claim 1 wherein said hydride is represented by $MI^xH_x$ and said hydroxide is represented by $MII^y(OH)_y \cdot wH_2O$, where MI and MII respectively represent ~~represents~~ Li or Li and an additional element or radical ~~said one or more cationic species other than hydrogen~~, x and y represent ~~represents~~ an average valence state of MI and MII, respectively, and w represents a stoichiometric amount of hydrated water.

22. (Currently Amended) The method of claim 21 wherein MI is Li and an additional element selected from the group consisting of Al, As, B, Ba, Be, Ca, Cd, Ce, Cs, Cu, Eu, Fe, Ga, Gd, Ge, Hf, Hg, In, K, La, ~~Li,~~ Mg, Mn, Na, Nd, Ni, Pb, Pr, Rb, Sb, Sc, Se, Si, Sm, Sn, Sr, Th, Ti, TI, V, W, Y, Yb, Zn, Zr, and mixtures thereof.

23. (Currently Amended) The method of claim 21 wherein MII is Li and an additional element selected from the group consisting of Al, As, B, Ba, Be, Ca, Cd, Ce, Cs, Cu, Eu, Fe, Ga, Gd, Ge, Hf, Hg, In, K, La, ~~Li,~~ Mg, Mn, Na, Nd, Ni, Pb, Pr, Rb, Sb, Sc, Se, Si, Sm, Sn, Sr, Th, Ti, TI, V, W, Y, Yb, Zn, Zr, and mixtures thereof.

24. (Currently Amended) The method of claim 21 wherein Ml and MII ~~are~~ each represent Li or Li and an additional element ~~elements~~ independently selected from the group consisting of Al, B, Ba, Be, Ca, Cs, K, ~~Li,~~ Mg, Na, Rb, Si, Sr, Ti, V and mixtures thereof.

25. (Currently Amended) The method of claim 21 wherein Ml and MII ~~are~~ each represent Li or Li and an additional element ~~elements~~ independently selected from the group consisting of Al, B, Be, Ca, K, ~~Li,~~ Mg, Na, Sr, Ti, and mixtures thereof.

26. (Currently Amended) The method according to claim 1 wherein said hydride is selected from the group consisting of: lithium hydride (LiH), ~~sodium hydride (NaH), potassium hydride (KH), beryllium hydride ($BeH_2$), magnesium hydride ($MgH_2$), calcium hydride ($CaH_2$), strontium hydride ($SrH_2$), titanium hydride ($TiH_2$), aluminum hydride ($AlH_3$), boron hydride ($BH_3$),~~ lithium borohydride ($LiBH_4$), ~~sodium borohydride ($NaBH_4$), magnesium borohydride ($Mg(BH_4)_2$), calcium borohydride ($Ca(BH_4)_2$),~~ lithium alanate ($LiAlH_4$), ~~sodium alanate ($NaAlH_4$), magnesium alanate ($Mg(AlH_4)_2$), calcium alanate ($Ca(AlH_4)_2$),~~ and mixtures thereof.

27. (Currently Amended) The method according to claim 1 wherein said hydroxide is lithium hydroxide ~~selected from the group consisting of: composition is selected from the group consisting of: lithium hydroxide (LiOH), sodium hydroxide (NaOH), potassium hydroxide (KOH), beryllium hydroxide ($Be(OH)_2$), magnesium hydroxide ($Mg(OH)_2$), calcium hydroxide ($Ca(OH)_2$), strontium hydroxide ($Sr(OH)_2$), titanium hydroxide ($Ti(OH)_2$), aluminum hydroxide ($Al(OH)_3$), boron hydroxide ($B(OH)_3$) and mixtures thereof~~.

28. (Original) The method according to claim 1 wherein said hydride comprises LiH and said hydroxide comprises LiOH.

29. (Original) The method according to claim 28 wherein said second reaction proceeds according to a reaction mechanism of $LiH + LiOH \rightarrow Li_2O + H_2$.

30-47. (Canceled)

48. (Original) The method according to claim 1 where said hydride comprises $LiBH_4$ and said hydroxide comprises LiOH.

49. (Original) The method according to claim 48 where said second reaction proceeds according to a reaction mechanism of $LiBH_4 + 4\ LiOH \rightarrow LiBO_2 + 2\ Li_2O + 4H_2$.

50-53. (Canceled)

54. (Original) The method according to claim 1 wherein at least a portion of said water is provided in the form of a hydrated hydroxide compound.

55. (Currently Amended) The method according to claim 54 wherein said hydrated hydroxide compound is selected from the group consisting of: hydrated lithium hydroxide ($LiOH \cdot H_2O$), ~~hydrated sodium hydroxide ($NaOH \cdot H_2O$), hydrated potassium hydroxide ($KOH \cdot H_2O$), hydrated barium hydroxide ($Ba(OH)_2 \cdot 3H_2O$), hydrated barium hydroxide ($Ba(OH)_2 \cdot H_2O$)~~, hydrated lithium aluminum hydroxide ($LiAl_2(OH)_7 \cdot 2H_2O$), ~~hydrated magnesium aluminum hydride ($Mg_6Al_2(OH)_{18} \cdot 4H_2O$),~~ and mixtures thereof.

56. (Canceled)

57. (Original) The method according to claim 54 wherein said hydride comprises LiH and said hydroxide comprises $LiOH \cdot H_2O$.

58-60. (Canceled)

61. (Original) The method according to claim 54 wherein said hydride comprises $LiBH_4$ and said hydroxide comprises $LiOH \cdot H_2O$.

62. (Canceled)

63. (Original) The method according to claim 54 where in said hydroxide comprises a non-hydrated hydroxide compound and a hydrated hydroxide compound.

64. (Original) The method according to claim 63 where said hydride comprises $LiBH_4$ and said hydroxide comprises LiOH and $LiOH \cdot H_2O$.

65. (Original) The method according to claim 63 where said reaction proceeds according to a reaction mechanism of $LiBH_4 + LiOH + LiOH \cdot H_2O \rightarrow Li_3BO_3 + 2\ Li_2O + 4H_2$.

66. (Original) The method according to claim 63 where said reaction proceeds according to a reaction mechanism of $2\ LiBH_4 + LiOH + 2\ LiOH \cdot H_2O \rightarrow Li_4B_2O_5 + LiH + 7\ H_2$.

67. (Currently Amended) A method of producing hydrogen comprising:

generating heat in a first reaction by reacting water with a portion of particles of a hydride present in a first material composition, wherein said heat is used in a second reaction; and

reacting in the solid-state another portion of particles of said hydride present in said first material composition which are mixed with particles of a hydroxide present in a second material composition in said second reaction, thereby forming hydrogen gas and a byproduct composition comprising an oxide, the portion of hydride particles participating in the first reaction being in contact with the other portion of hydride particles and the hydroxide particles to provide said heat for the second reaction, the hydride comprising a lithium-containing cation and the hydroxide comprising a lithium-containing cation.

68. (Original) The method according to claim 67 wherein said second reaction commences while said first reaction is occurring.

69. (Original) The method according to claim 67 wherein said heat provides an activation energy sufficient to commence said second reaction.

70. (Original) The method according to claim 67 wherein said second reaction is exothermic.

71. (Original) The method according to claim 67 wherein said second reaction is endothermic.

72. (Currently Amended) A hydrogen storage composition having a hydrogenated state and a dehydrogenated state:

(a) in said hydrogenated state, said composition comprises a mixture of particles of a hydride and a hydrated hydroxide, the quantity of the hydride being sufficient to react with the water content and hydroxide content of the hydrated hydroxide for a solid-state reaction to produce hydrogen gas and an oxide, the hydride comprising a lithium-containing cation and the hydroxide comprising a lithium-containing cation; and

(b) in said dehydrogenated state, said composition comprises the oxide.

73. (Currently Amended) The composition of claim 72 wherein said hydride is represented by the formula $MI^{x}H_{x}$, where MI represents Li or Li and an additional element or radical ~~one or more cationic species other than hydrogen~~, and x is an average valence state of MI.

74. (Currently Amended) The composition of claim 72 wherein said hydrated hydroxide is represented by the formula $MII^{y}(OH)_{y}\cdot wH_{2}O$, where MII represents Li or Li and an additional element or radical ~~one or more cationic species other than hydrogen~~, y is an average valence state of MII, and w represents the stoichiometric ratio of water in said hydrated hydroxide.

75. (Currently Amended) The composition of claim 72 wherein said hydride is represented by $MI^{x}H_{x}$ and said hydrated hydroxide is represented by $MII^{y}(OH)_{y}\cdot wH_{2}O$, where

MI and MII respectively represent Li or Li and an additional element or radical ~~said one or more cationic species other than hydrogen~~, x and y represent average valence states of MI and MII, respectively, and w represents the stoichiometric ratio of water in said hydrated hydroxide.

76. (Currently Amended) The composition of claim 72 wherein said hydride is represented by $MI^{x}H_{x}$ and said hydrated hydroxide is represented by $MII^{y}(OH)_{y}\cdot wH_{2}O$, where MII represents lithium and an additional element or radical ~~said one or more cationic species other than hydrogen~~, y represents an average valence state of MII, and w represents a stoichiometric amount of hydrated water.

77. (Currently Amended) The composition of claim 76 wherein MI represents Li or Li and one or more elements ~~is~~ selected from the group consisting of Al, As, B, Ba, Be, Ca, Cd, Ce, Cs, Cu, Eu, Fe, Ga, Gd, Ge, Hf, Hg, In, K, La, ~~Li,~~ Mg, Mn, Na, Nd, Ni, Pb, Pr, Rb, Sb, Sc, Se, Si, Sm, Sn, Sr, Th, Ti, TI, V, W, Y, Yb, Zn, Zr, and mixtures thereof.

78. (Currently Amended) The composition of claim 76 wherein MII represents Li or Li and one or more elements ~~is~~ selected from the group consisting of Al, As, B, Ba, Be, Ca, Cd, Ce, Cs, Cu, Eu, Fe, Ga, Gd, Ge, Hf, Hg, In, K, La, ~~Li,~~ Mg, Mn, Na, Nd, Ni, Pb, Pr, Rb, Sb, Sc, Se, Si, Sm, Sn, Sr, Th, Ti, TI, V, W, Y, Yb, Zn, Zr, and mixtures thereof.

79. (Currently Amended) The composition of claim 76 wherein Ml and MII are each Li or Li and one or more elements independently selected from the group consisting of Al, B, Ba, Be, Ca, Cs, K, Li, Mg, Na, Rb, Si, Sr, Ti, V and mixtures thereof.

80. (Currently Amended) The composition of claim 76 wherein Ml and MII are each lithium ~~elements independently selected from the group consisting of Al, B, Be, Ca, K, Li, Mg, Na, Sr, Ti, and mixtures thereof~~.

81. (Currently Amended) The composition according to claim 72 wherein said hydrated hydroxide is selected from the group consisting of: hydrated lithium hydroxide ($LiOH\cdot H_{2}O$), ~~hydrated sodium hydroxide ($NaOH\cdot H_{2}O$), hydrated potassium hydroxide~~

~~($KOH \cdot H_2O$), hydrated barium hydroxide ($Ba(OH)_2 \cdot 3H_2O$), hydrated barium hydroxide ($Ba(OH)_2 \cdot H_2O$),~~ hydrated lithium aluminum hydroxide ($LiAl_2(OH)_7 \cdot 2H_2O$), ~~hydrated magnesium aluminum hydride ($Mg_6Al_2(OH)_{18} \cdot 4H_2O$),~~ and mixtures thereof.

82. (Currently Amended) The composition of claim 72 wherein said hydride is selected from the group consisting of: lithium hydride (LiH), ~~sodium hydride (NaH), potassium hydride (KH), beryllium hydride ($BeH_2$), magnesium hydride ($MgH_2$), calcium hydride ($CaH_2$), strontium hydride ($SrH_2$), titanium hydride ($TiH_2$), aluminum hydride ($AlH_3$), boron hydride ($BH_3$),~~ lithium borohydride ($LiBH_4$), ~~sodium borohydride ($NaBH_4$), magnesium borohydride ($Mg(BH_4)_2$), calcium borohydride ($Ca(BH_4)_2$),~~ lithium alanate ($LiAlH_4$), ~~sodium alanate ($NaAlH_4$), magnesium alanate ($Mg(AlH_4)_2$), calcium alanate ($Ca(AlH_4)_2$),~~ and mixtures thereof.

83. (Canceled)

84. (Original) The composition of claim 72 wherein said hydride comprises LiH and said hydrated hydroxide comprises $LiOH \cdot H_2O$.

85-87. (Canceled)

88. (Original) The composition of claim 72 wherein said hydride comprises $LiBH_4$ and said hydrated hydroxide comprises $LiOH \cdot H_2O$.

89. (Canceled)